

Costa has long contended that flawed water regulations are devastating the local economy by diverting water from the Valley in the name of saving fish while all but ignoring the effects of pollutants entering the Bay Delta from as far north as the Bay Area and Sacramento.

A University of Maryland study examines the impact of dumping pollutants on fish populations in the Bay Delta. The study recommends that efforts to restore the threatened California Delta smelt and other declining fish should focus more sharply on reducing nutrient pollution to the species' native waters.

"Our fight for more water is producing results," said Costa. "The Administration is moving forward to revise the biological opinions restricting water for the Valley. But we must keep the pressure on and hold their feet to the fire. The stakes for the Valley are too high.

"The only way to address our water challenges is to take a commonsense and comprehensive approach to the Bay Delta. This means putting aside the politics and finger pointing to look at the facts.

"The Maryland study is another in a growing number of findings as to how flawed and one-sided the regulations restricting the flow of water to the Valley are. The truth is that the dumping of ammonia, nitrates, and sewage into the Delta is having a catastrophic effect on the same fish the regulations are trying to save."

Key quotations from the study and a copy of the release issued by the University of Maryland Center for Environmental Science are copied below.

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Key Quotations Regarding the Impact of Pollution on the Food Supply and Abundance of Delta Smelt and Other Aquatic Species

Excerpted from Dr. Patricia M. Glibert, University of Maryland, "Long-term Changes in Nutrient Loading and Stoichiometry and their Relationships with Changes in the Food Web and Dominant Pelagic Fish Species in the San Francisco Estuary, California"

"Beginning in the early to mid 1980s, the ecosystem was characterized by sharp declines in delta smelt, longfin smelt, and young-of-the-year striped bass....While smelt is a planktivore, not all the fish studied here are, but all require zooplankton as food at least in their larval or juvenile stages or rely on prey that rely on zooplankton. As predators increased, those fish that were in decline due to changes in food supply were subjected to additional stresses of predation. In the most recent decade, there were the further declines in smelt, along with silversides and threadfin shad. During this time, NH₄ {ammonium} loading from wastewater discharge increased 25%, from ~ 9 metric tons to 12 metric tons day, leading to a strong correlation over the time series of CUSUM trends in wastewater effluent NH₄ and the delta smelt." Pages 23-24

“The overwhelming conclusion here is the fact that relationships between nutrients and fish are stronger than those of flow and fish....Water restrictions are thought to be required to reduce further loss of these fish by entrainment in export pumps. However, management strategies to date have not reversed fish declines because they have not addressed the ultimate cause of the change at the base of the food web and the complex role of nutrient form and quantity.” Pages 24-25.

“The present study supports the premise that reduction of the NH₄ {ammonium} effluent into the Bay Delta is essential to restoring historic pelagic fish populations and that until such reductions occur, other measures, including regulation of water pumping or manipulations of salinity, as has been the current strategy, will likely show little beneficial effect. By altering nutrient composition and nutrient load, it is likely that a healthy phytoplankton assemblage including diatoms could be restored. A clear management path is the application of nitrification and denitrification processing of the dominant nutrient source, the wastewater effluent, prior to discharge into the estuary to 1) decrease NH₄ concentration in the river; 2) reduce N:P ratio of the effluent; and 3) increase NO₃:NH₄ ratio to a level required to increase diatom abundance to support a more favorable food web for fish production. Pre-1982 nutrient concentrations and ratios could serve as a management target.” Page 25

“Thus, a clear management strategy is the regulation of effluent N discharge through nitrification and denitrification. Until such reductions occur, other measures, including regulation of water pumping or manipulations of salinity, as has been the current strategy, will likely show little beneficial effect. Without such action, the recovery of the endangered pelagic fish species is unlikely at best.” Page 29.

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New Research Links Decline of Endangered California Delta
Smelt to Nutrient Pollution

Study suggests pollution reductions could help restoration efforts

Cambridge, Md. (May 17, 2010) – A new study to be published in the academic journal *Reviews in Fisheries Science* recommends that efforts to restore the endangered California delta smelt and other declining pelagic fish should more sharply focus on reducing nutrient

pollution to the species' nativewaters. The research indicates these fish populations would greatly benefit from reductions in the amount of nitrogen flowing into Sacramento-San Joaquin Bay-Delta from wastewater treatment plants and balancing the ratio of nitrogen and phosphorus contained in the discharged water.

"While a great deal of emphasis has been placed on ensuring there is enough water for delta smelt, we also need to recognize that the water also has to have the right chemical balance," said Dr. Patricia Glibert of the University of Maryland Center for Environmental Science. "The research shows us that reducing the amount of nitrogen from Bay-Delta wastewater treatment plants should aid the recovery of the delta smelt population. The high nutrient loads are affecting the algae at the base of the food web, which in turn, affect the food supply for the fish. This has altered the ecology of the system over many years."

For her research, Dr. Glibert analyzed 30 years of water chemistry, river flow, plankton, fish population and effluent discharge data to determine possible linkages to the population of the delta smelt and other pelagic fish in the Bay-Delta system. The analysis reveals that declines in delta smelt population most closely coincide with effluent changes from the region's major wastewater treatment plant.

"The effect of nutrient loading on fish populations has been in debate for some time," said Dr. Glibert. "While the current rate of wastewater discharge is within established permit and nutrient criteria guidelines, the ecology appears to require environmental conditions more favorable than these guidelines. In this study, a broad-scale, long-term approach was taken to understand how nutrients are related to the food web."

"Reviews in Fisheries Science is pleased to publicly release this research prior to being published in our print edition," said journal editor Dr. Sandra E. Shumway of the University of Connecticut. "We believe this research will contribute to the regional public discussions about this issue and will have significance for other nutrient impacted coastal systems elsewhere as well."

A professor of ecology and oceanography at the University of Maryland Center for Environmental Science Horn Point Laboratory and member of the National Academy of Sciences committee examining sustainable water and environmental management in the California Bay-Delta, Dr. Glibert's research focuses on nitrogen cycling, harmful algal blooms and their relationships with the food web. In addition to this research, Glibert is conducting, or has recently completed, research projects in Chesapeake Bay, Florida Bay, the Arabian Sea, East China Sea, and Australia and she currently serves as co-Chair of the international working group on land based nutrient pollution and harmful algal blooms.

The San Francisco Estuary, which encompasses the Sacramento-San Joaquin Bay Delta, is one of the largest estuarine systems on the Pacific Coast as well as one of the largest managed and

engineered water systems in the United States. It is the largest source of municipal and agricultural fresh water in California and is home to several economically important fisheries. The Bay-Delta is the subject of considerable national public awareness due to the sociopolitical

and socioeconomic tension surrounding the plight of the endangered delta smelt (*Hypomesus transpacificus*) and the courtordered modifications of water diversion projects to protect the species.

The article, “Long-term changes in nutrient loading and stoichiometry and their relationships with changes in the food web and dominant pelagic fish species in the San Francisco Estuary, California,” will appear in *Reviews in Fisheries Science* later this year. This research was supported by the National Science Foundation and California State Water Contractors and San Luis & Delta-Mendota Water Authority.

The University of Maryland Center for Environmental Science is the University System of Maryland’s environmental research institution. UMCES researchers are helping improve our scientific understanding of Maryland, the region and the world through five research centers – Chesapeake Biological Laboratory in Solomons, Appalachian Laboratory in Frostburg, Horn Point Laboratory in Cambridge, Institute of Marine and Environmental Technology in Baltimore, and the Maryland Sea Grant College in College Park.